

In the Claims

Listing of the Claims

This listing of claims will replace all prior versions, and listings, of the claims in the application.

1. (Currently Amended) Golf club head that is at least partly made of a corrosion-free, precipitation-hardened, maraging steel with a martensite temperature $M_s \geq 130^\circ\text{C}$, a ferrite content $\text{Ferrite} < 3\%$, wherein the maraging steel essentially consists of 6.0 to 9.0 wt.% nickel, 11.0 to 15.0 wt.% chromium, 0.1 to 0.3 wt.% titanium, 0.2 to 0.3 wt.% beryllium, the rest being iron together with unavoidable impurities, and wherein ~~The~~ the maraging steel in accordance with the invention exhibits a tensile strength $R_m > 2000\text{ MPa}$ and a yield strength $R_{p0.2} > 1900\text{ MPa}$.
2. (Currently Amended) Golf club head in accordance with claim 1 ~~characterized by the fact that~~ wherein up to 35% of the chromium content can be replaced by molybdenum and/or tungsten.
3. (Currently Amended) Golf club head in accordance with claim 2 ~~characterized by the fact that~~ wherein the maraging steel essentially consists of 8.0 wt.% nickel, 13.0 wt.% chromium, 0.2 wt.% titanium, 0.25 wt.% beryllium, 1.0 wt.% molybdenum, the rest being iron together with unavoidable impurities.
4. (Currently Amended) Golf club head in accordance with ~~one of the claims~~ claim 1 to 3 ~~characterized by the fact that~~ wherein the maraging steel comprises up to 0.1 wt.% cerium or cerium misch metal as a deoxidizing agent.

5. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 1 to 4 characterized by the fact ~~that~~wherein the maraging steel can comprise at least one of the elements manganese, niobium or silicon in individual proportions of less than 0.5 wt.%.
6. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 1 to 5 characterized by the fact ~~that~~wherein the maraging steel comprises at least one of the elements C, N, S, P, B, H, or O in individual proportions of less than 0.1 wt.%.
7. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 5 or 6 characterized by the fact ~~that~~wherein the maraging steel exhibits a martensite temperature $M_s = [629.45 - 6.8(\text{Cr} + 1.2 \text{ Mo} + 0.6 \text{ W}) - 24.5(\text{Ni} + 0.15 \text{ Co}) - 13.2 \text{ Mn} - 11.2 \text{ Si} - 670(\text{C} + \text{N})]$ °C.
8. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 5 to 7 characterized by the fact ~~that~~wherein the spring steel exhibits a ferrite content $^{\circ}\text{Ferrite} = [11.8 \text{ Si} + 7.92(\text{Cr} + \text{Mo} + 0.5 \text{ W}) + 15.84 \text{ Ti} - 2.91 \text{ Mn} - 5.83(\text{Ni} + 0.3 \text{ Co}) - 174.9(\text{C} + \text{N}) - 77.08]$ wt.%.
9. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 1 to 8 characterized by the fact ~~that~~wherein the maraging steel exhibits a tensile strength $R_m > 2400 \text{ MPa}$.
10. (Currently Amended) Golf club head in accordance with claim 9 ~~characterized by the fact that~~wherein the maraging steel exhibits a tensile strength R_m of approximately 2800 MPa.
11. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 1 to 8 characterized by the fact ~~that~~wherein the maraging steel exhibits a yield strength $R_{p0.2} > 2100 \text{ MPa}$.

12. (Currently Amended) Golf club head in accordance with claim 11 ~~characterized by the fact that~~wherein the maraging steel exhibits a yield strength $R_{p0.2}$ of approximately 2500 MPa.
13. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 1 to 12 ~~characterized by the fact that~~wherein the maraging steel exhibits an alternating flexure strength σ_{bw} of approximately 1350 MPa.
14. (Currently Amended) Golf club head in accordance with claim 13 ~~characterized by the fact that~~wherein the maraging steel exhibits an alternating flexure strength σ_{bw} of approximately 1550 MPa.
15. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 1 to 14 ~~characterized by the fact that~~wherein the maraging steel exhibits a Vickers hardness $HV > 700$.
16. (Currently Amended) Golf club head in accordance with claim 15 ~~characterized by the fact that~~wherein the maraging steel exhibits a Vickers hardness $HV > 800$.
17. (Currently Amended) Golf club head in accordance with ~~one of the claims~~claim 1 to 16 ~~characterized by the fact that~~wherein the maraging steel exhibits a maximal storable energy of more than 30 MPa.
18. (Currently Amended) Golf club head in accordance with claim 17 ~~characterized by the fact that~~wherein the maraging steel exhibits a maximal storable energy of approximately 40 MPa.
19. (Currently Amended) Process for the manufacturing of maraging steel for a golf club head in accordance with ~~one of the claims~~claim 1 to 18 ~~characterized by~~comprising the following process steps:

- a) Melting the alloy under vacuum or protective gas followed by casting into an ingot;
- b) Hot forming the ingot into a strip at $900\text{ }^{\circ}\text{C} \leq T_1 \leq 1150\text{ }^{\circ}\text{C}$;
- c) Carrying out a solution annealing of the strip at $850\text{ }^{\circ}\text{C} \leq T_2 \leq 1100\text{ }^{\circ}\text{C}$;
- d) Cooling the strip to a temperature $T_3 \leq 300\text{ }^{\circ}\text{C}$;
- e) Grinding the strip to remove the beryllium-depleted edge zone;
- f) Cold forming the strip with a cold forming degree that is greater than or equal to 60%;
- g) First heat treatment of the strip at $400\text{ }^{\circ}\text{C} \leq T_4 \leq 550\text{ }^{\circ}\text{C}$ for a duration of 1 hour to 10 hours.

20. (Currently Amended) Process in accordance with claim 17
~~characterized by~~comprising the following additional process step:

- h) Second heat treatment of the strip at $300\text{ }^{\circ}\text{C} \leq T_5 \leq 470\text{ }^{\circ}\text{C}$ for a duration of ten to 100 hours.